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GEOGRAPHY FOR SECONDARY SCHOOLS

THE Editor of the JOURNAL has long been much dissatisfied with certain tendencies in reference to physical geography in secondary schools. Finding by informal discussion that others were also in a similar state of mind, he recently sent out a small series of questions to a number of geographers, teachers of geography and superintendents, to ascertain if any agreement could be reached as to the present needs and future possibilities of secondary school geography.

To date, twelve replies have been received, representing the opinions of seven teachers in universities, four in normal schools and one in a high school. Although permission to publish the names of the writers has, in most cases, been given, it seems to the Editor best to print the replies without credit, in order that all may be quoted with equal freedom.

The questions sent out were as follows:

1. Do you believe that secondary school geography for students not preparing to enter college should be restricted to physical geography as outlined in the modern text-books?

2. Do you favor a continuation and development of the modern practice of emphasizing the detailed, systematic classification of land forms?

3. Should the course for pupils not expecting to enter college be in any way different from that for pupils preparing for college entrance?

4. Do you believe that secondary school geography would be equally valuable as a subject for pupils not proposing to enter college, if it included more of a study of selected regions of the world? *Either*

a. Studied in association with the distribution of the greater land forms as, for instance, the plains of North America, of Europe, etc., as related to the life consequences, *or*

b. Given in a definite course devoted to regional geography of, say, the United States and Western Europe, in which the order from causes

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to consequences should be rigidly followed. For instance, in the study of North America, the work to proceed from position to the larger land features, to drainage, to climate, to economic and social conditions.

5. Could a course along these lines be as disciplinary and strong as the present generally followed course? Would such a course be as good or a better preparation for students who have also to study history and perhaps economics, and who need geography as a preparation for living and not for college entrance?

6. Should commercial geography be included in non-technical high schools? If so, should it be as a separate course or as an important phase of some systematic regional treatment as outlined above?

7. Is the content of the modern course too much influenced by our belief in the necessity of laboratory treatment?

8. Do you think that the good results from laboratory training would be sacrificed if the presentations were a little less formal and included more of an emphasis of the life response side?

The answers received follow, including individual comments from the writers.

A.

1. No.
2. No. Rather in the college.
3. No.
4. a No.
   b Yes.
5. Yes.
6. No. Enough of the commercial could be woven into the regional.
7. Perhaps. But laboratory treatment could be very well introduced into the regional geography as well, and with as good results.
8. Yes.

B.

1. No.
2. Yes, if this means that high school pupils are to continue studying such books as are now in frequent use; but I do not object to the study of other phases of geography also.
3. No. I should prefer to put this question the other way round: Course for those who prepare to go to college should not differ from that for those who do not. The minority should follow the

majority. See Report of Committee of Ten, 1893. One hundred members of that committee and sub-committees voted unanimously, I think, for this principle.

4. From all that I have seen, the introduction of areal study before systematic study results in rather vague ideas. It can be done and made interesting and profitable. In the hands of poorly prepared teachers, themselves ignorant of the land forms about which they are to teach from a text-book, I think the descriptive course is much safer than the systematic course. I should be glad to see more actual examples introduced with systematic work, or more systematic explanations given in areal work; but unless some such combination is made, I fear that the results will be unscholarly.
5. See 4 and 3.
6. I do not know enough about what is actually being done about commercial geography to answer this intelligently. There does not seem to me to be sufficient reason for sharp separation of commercial geography in schools from other kinds of geography. I should like to see the whole thing well knit in a rational whole.
7. No. Laboratory treatment ought to be increased; but before that it ought to be improved. From what I have seen of it in our admission examinations, the things that now pass for laboratory work in physical geography are poor stuff, in most cases; they show that the teachers have not had a sufficient training in laboratory work themselves.
8. This question implies that I know what you mean by "less formal." Less formal than what? Certainly the work should not be "too formal," and it should have a lot of illustration of the life response side.

I suppose all of your questions are apropos of what has been called the exaggerated attention to physical geography that has come about in the last twenty years and from which there is now something of a reaction. I think the exaggeration results from an unbalanced training on the part of the teachers, as much as from anything else. Too many of them follow the book only. If the book is purely physical geography, their teaching will be of the same purity; an undesirable purity, in my opinion.

C.

1. No, not necessarily.
2. Yes.

3. (Also 1.) Depends on the school officers and teachers. In most schools I should say they should be the same.
4. No, unless the teacher has the time and is competent to give a supplementary course. I do not believe it would be wise or fruitful to branch out on either line without a physical geography basis.
5. It is possible, under the exceptional teacher. Under the ordinary teacher I should say no.
6. No. There are too many subjects now and I doubt the wisdom of the course proposed.
7. I think not. There is room for improvement in the kind of laboratory work. I should say improve the quality but do not decrease the quantity.
8. Question not clear, as I infer it is much less formal in some schools than in others.

D.

1. Physical geography alone is not sufficient unless much emphasis is put on the life side. A better course is physical plus commercial geography in one course or two.
2. Decidedly no; I consider the emphasis put on systematic classification of land forms to have been a distinct detriment to geographical teaching in this country.
3. No; the physical geography presented by pupils for college is of little use in advanced work and it would be much better if such students should have pursued a general course without reference to college examinations.
4. I think secondary school geography should contain much more of a study of regions of the earth on a large scale as related to the life consequences.
5. Such a course could be made thoroughly disciplinary and would be very much better preparation for students who intend to study history or economics or who need geography as part of a general training.
6. Commercial geography, I think, should be in all schools, but rather as a part of a course in physical geography than as a separate, statistical treatment of commerce.
7. Yes; there is danger of pushing laboratory treatment in physical geography to a point where reasoning is omitted, and I think this has been accomplished in some of our most thoroughly equipped schools.

8. I can not see how good results from laboratory training could be sacrificed if a greater attention was devoted to "life response." In any case, it is far better to give a pupil an appreciation of man's relation to his environment than to develop skill in reading instruments and drawing sections.

In conclusion let me say that I am in hearty accord with any movement which will rescue physical geography from the geological chain which seems to bind it. In some ways, the teaching of physical geography twenty years ago was designed to give a better training to the student than the highly developed laboratory presentations of the present day.

E.

1. I do not believe that we should restrict geography work in secondary schools to purely physical geography, for those students who do not present it for college have no place in this course, but that the physical geography should be made to include more of an application to life, rather than so much technical classification of land forms.
2. The detailed classification of land forms occupies too much space, in my opinion. A larger part of the time should be given to teaching the effects of these forms upon life.
3. The course for pupils not expecting to go to college should be the same as that for college candidates. The colleges, it seems to me, should be willing to accept a course in this subject with less detail technically, and one more in line with "2."
4. Secondary school geography would be equally valuable to the pupil not entering college, if it included more of a study of selected regions of the world, as suggested in "4b." The local conditions should be studied to learn how physical conditions affect the locations, growths and sizes of cities, for example.
5. The test of a course, it seems to me, is not in the number of facts the pupil carries away with him, so much as the development of a power to observe closely and reason clearly from cause to effect. History study and perhaps the study of economics would be made more interesting, I think, if the pupil could picture to himself the appearance of the regions concerned and could see a reason for certain developments, in the very nature of the country. Such a course would seem to be a better preparation for living than the technically elaborate physiography.

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6. Commercial geography should not be included in a non-technical high school. If it were necessary to include it, it might be of advantage to teach it in connection with the physical geography of the regions studied. Students should be able to see a reason for certain commercial development as connected with the physiography of the regions.
7. I should not like to see the amount of laboratory work cut down. There might be more library research work, perhaps, and it seems to me we get little enough field work at present.
8. I do not think the good results from laboratory work would be sacrificed if the presentation were a little less formal and there might well be more time spent on the life response side.

F.

1. I certainly do not believe that secondary school geography should be so restricted. The present course should be increased to a one-year course by the addition of suitable material, perhaps in regional geography. Where electives can be offered (and the number of such high schools is growing) a second-year course devoted to regional geography should be among the options.
2. The present tendency is certainly in the opposite direction and I think very properly. The first need of children (this includes first-year high school students) is an enlarged and enriched stock of mental pictures of the world, its processes and its contents. Detailed classifications are for those who have something to classify and are indispensable to advanced work, but they are deadening to the elementary student. (Compare biological sciences.)
3. The sooner the colleges abandon the notion of separate courses for these two classes, the better it will be for the colleges.
4. I should not try to kill two birds with one stone in one-half year. Where the course is lengthened to a full year, there may well be a choice between (1) basing the whole year on study of principles, bringing in the regional work by way of illustration, and (2) giving at least a part of the time to studies primarily regional.
5. It is hard to answer categorically. Either course needs good teachers and needs them badly.
6. The *bait* here is the word "commercial." The rational teaching of it involves so full a treatment of general and physical geography, that the word "commercial" is too narrow. If it is taught in this

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rational way it will not differ much from the teaching of regional geography with the emphasis on human response. If not taught in this way, it has no place outside of a technical school.

7 and 8. The dangers in laboratory work probably lie in the direction of formality, but I do not have the intimate knowledge of laboratory work in secondary schools necessary to answer these questions.

G.

I was inclined to answer questions 1 and 2 in the affirmative until I read those which follow, but to question 3 I would say decidedly, no.

The questions as presented make a very decided distinction between pupils who expect to enter college and those who do not. It seems to be taken for granted that the pupil who wishes to go to college *must* take a certain kind of physical geography, but that one who does not *may* take another kind which it is admitted may or even probably will be a better preparation for life and for the study of history and economics. Are we to assume, then, that the pupil who is to go to college need not make any preparation for life or that he will not study history and economics?

I object to this distinction between pupils. It assumes that they would not study the kind of physical geography required for admission to college from their own choice but because they must. If it fails to interest the pupil who is not going to college, then it is a poor kind of geography even for the one who is going.

I believe that I can still answer Question 1 in the affirmative, however, with this modification, namely, that there shall be incorporated into the course, and eventually into the text-books, what is suggested in Question 4a. I would not go so far as to recommend a distinct course as suggested in Question 4b.

I can also answer Question 2 in the affirmative, provided the systematic classification of land forms be carried no farther than in Professor Davis's Elementary Physical Geography. It is not desirable to divide and subdivide merely for the sake of having a "system." I fear that some of us have lost sight of the purpose of classification in so far as we have made the systematic study of land forms an end and not a means. Any rational classification which places the majority of the land forms in a few great groups is sufficient for the purposes of the pupil.

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I anticipate Question 8, which is closely related to Question 2, to say that to leave out the human element of physical geography is to invite first the indifference and finally the distaste of the pupils for that subject, at least in the high school. Physiography for its own sake may be all right in college, but it will not do in a high school. If that is the idea of Question 2, then I say no, but if it is merely to continue about as at present, then I am willing to "emphasize."

Commercial geography is not especially desirable in a non-technical high school. In view of the crowded curriculum it may well be omitted. Commercial geography should be treated either in an elementary way in the grades below the high school or else in a more specialized course for which the completion of the regular course in physical geography should be required for admission to the class. Such a course as the latter would belong more properly in a commercial or technical high school.

To Questions 7 and 8 I would say no, with such qualifications as are suggested in the answer to Question 2.

H.

1. No.
2. I am not sure I know what you mean. If such descriptions as "an imperfect peneplain sub-maturely dissected" are in mind, I find them inappropriate to secondary school work.
3. At present the colleges ask nothing and *credit* nothing. Colleges are harder to move, more conservative, than the public schools. It will be long before they will credit any high school geography not physical. Meantime, perhaps we can get into other courses than the college preparatory some geographic *work*. In so far a different course would be helpful. If possible, the colleges should recognize the work and the course be the same for all.
4. Yes. I would not limit treatment to "a" or "b" given.
5. Yes; of course the work must be *good,* with a *good* teacher.
6. Either way the *teacher* wanted to do it. Teachers should be pretty free.
7. I do not know.
8. Hard to answer. There ought to be applications to influence on life all the time.

I.

1. No. The chief value of physical geography lies in its wide and intimate relations with other subjects. It forms a necessary basis

for the fruitful study of all other phases of geography, of plant, animal and human ecology, politics, history and sociology.

2. No. The detailed, systematic classification of land forms is already overdone in secondary schools. Somewhat less emphasis should be given to their structure and origin, and more to their functions as organic environments.
3. That depends upon the nature of college entrance requirements. The course should be planned for the large majority of students who do not go to college, and the college requirements should conform to that.
4. Yes. The course in secondary school geography would be more valuable for all students, if it included a study of selected regions. The regional method is the only one which calls for a complete synthesis of all the geographic factors. The selection of regions should not be made wholly upon the basis of land forms, but also upon that of climate and vegetation. It is time that the absurd custom of teaching geography by political divisions should be abandoned. The regions should be physiographic in the fullest sense. This is especially true of North America. In Europe the political divisions have become fairly adjusted to physical conditions. On any scheme of physical division the treatment should be rigidly scientific from causes to consequences.
5. Yes, such a course, if based upon an adequate physical foundation, would be more valuable than the course generally followed at present, for all students who are to live and do business in the world and especially for those who are to study history, economics and sociology in college.
6. Commercial geography is the least valuable of all the phases of geography now taught. It is poorly organized, its subject matter is undergoing perpetual transformation and, as often taught, it lacks both foundation and framework. It is apt to be a mass of dry statistics which are soon forgotten, but not sooner than they cease to be correct. The general principles of economic geography, the relations of natural resources to the production of wealth, may be profitably studied as a phase of systematic regional geography.
7. Yes. Laboratory work in geography is largely a figure of speech. It can not be, except to a limited extent, work which brings the student face to face with the actual material of the science, as in chemistry and botany. That can be done only in the field. It is

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necessarily a study of representations and graphics. Such work, under whatever name, is indispensable for good teaching in any phase of geography, and will be productive of equally good results in regional geography as in physical. A map of waterways or of population density is not less educative than a relief map or a weather map.

8. No. Reasons have been given in 7.

J.

1. Secondary school geography for students who are not preparing to enter college should not be restricted to the study of physical geography. The daily experiences of the average adult call for a knowledge of the regions of the world,—their physiography, industries, products and the actual life of their peoples—which a course in physical geography does not give. This knowledge is needed in business, in reading, in social intercourse. Many high school graduates, without any additional training, take up the work of teaching. It is evident that they are not prepared to teach geography in the elementary schools.
2. The present practice of laying stress upon the study of land forms is good when it leads to a clear understanding on the part of students of the influence of these forms upon human activities. Too frequently the human side of the subject is neglected.
3. Pupils not expecting to enter college or a normal school should not be required to take a year's work in physical geography. A better plan would be to devote one semester to such work, and one to general or economic geography. This would give a broader preparation for living.
4. As already indicated, pupils not intending to enter college would be greatly benefited by a study of one or more great regions. Such study should, in all cases, have as a foundation a brief course in physical geography. There would, at present, be some difficulty in placing in the hands of the students satisfactory texts.
5. As to the disciplinary value of regional and economic geography, when it is properly presented, there can be no question. Such work is a better preparation for the study of history and economics and for the ordinary affairs of life than is one devoted strictly to physical geography.
6. Commercial geography should, in my judgment, be offered in *all* large high schools. It should, however, be much more than a

presentation of statistics and a brief description of commodities and methods of handling them. A course in commercial geography should include a close study of the influence of physiographic conditions upon industry and commerce. It should also deal with the changes which man has made in his environment and with the effect of industries and commerce upon social conditions.

7. Rational laboratory work in physical geography is absolutely essential. Without it our students acquire little but the ability to use words. Laboratory work which deals extensively with the astronomical phase of geography or with mineralogy is not rational.

8. The chief purpose of school geography is to give students an understanding of the relations between life and its environment. Unless secondary school geography shows students how man makes use of, responds to, and modifies his environment, it has not been a success. There is great need of placing more emphasis upon the human side of geography in our laboratory and other phases of the work.

K.

Our high schools are, in most instances, overpowered by the college entrance requirements. These schools have had their courses shaped, to a large degree, by the college demands. There have been signs, and still are, of a more efficient high school than is now the case. The private and special institution has dictated, I believe, too long. The cry for industrial high schools and the criticism of the product of our high schools has arisen, to some extent, from this condition of affairs. To prepare for college is not the aim of our schools.

My answers to your queries, influenced somewhat by the above state of mind, follow:

1. No.
2. Yes.
3. Not in the main features.
4. Yes. I am not prepared to decide between "a" and "b". The grammar schools offer physical geography as the culmination of the geography work in the grade schools. During the earlier years of the high school course, a more mature consideration of geography than is possible in the grade schools, is thereby rendered easy. That such a course would have its advantages and be beneficial to a high degree, I am convinced. Whether this should be systematic or

regional (regional rounds out the courses, as I know them, better) must be left with the instructor to some extent. I believe such a course should be required of all pupils in the high schools during the first or second year. The physical geography which has found a place in certain courses, as in the English course, not in the classical course, during the last year of the high school outline is worth retaining at this place.

5. The course suggested under Query 5 could be as disciplinary and as strong as the present generally followed course. It certainly could not be so at once. With proper development, it should be beneficial in future work either at school or out of school.

6. In the high school of many courses, in cities where no technical high school exists, commercial geography has a place in the business course. In the Latin high schools, or the classical course of smaller high schools, there is a need of regional or systematic geography, as stated above, but not of commercial geography.

7. There is a tendency in that direction.

8. No. The division of the time allotted for physical geography into recitation periods and laboratory periods is unfortunate in the early stages of the subject's development. The two periods are apt to follow different lines of thought and the pupil makes the connection between the two with an effort. I believe that the laboratory work and the field excursions are of the most benefit when they are included in the method of presentation of the subject at the time of the recitation and as a part of it.

L.

I am of the opinion that secondary school geography for all students should not be restricted to the outlines of the subject in the present high school text-books, but should be a rather broader study, including a very much greater emphasis of the life side. In other words, I think that physical geography, which has undergone remarkable changes in the last few years, is destined to undergo even greater changes, and that the time devoted to the present, admirable, systematic classification of land forms must be curtailed in the elementary courses in order to make room for a more systematic treatment of life in its relationship to all geography.

I do not see how it is possible to make a course for students who are going to college any different from that for students not prepar-

ing for college entrance. I am convinced that it would be wise for college entrance. I am not convinced that it would be wise to introduce courses in regional geography in the secondary schools. It seems to me that the same results can be brought about by making the introductory geography of the higher grades contain more of the subject matter of such a course as suggested in 4b. In other words, the regional geography ought to be developed in connection with a study of the greater land forms themselves, but not otherwise independently except in college. Additional subject matter on regional geography of the continents might, however, be provided in supplementary geographical readers.

I see no reason why a course developed along the systematic lines of relation of influence to consequences on the life side could not be made exactly as strong and just as disciplinary as systematic studies of land forms. Such courses would naturally be a better preparation for students who are to study history or economics or who are going to work along various commercial lines for their living.

I think commercial geography should be made an important phase of the systematic treatment either in the secondary school geography or in the high school physical geography course of the broader type, and not a separate course. I do not feel that laboratory work in the hands of the proper instructor is in danger of distorting the point of view in the modern course, and it would naturally follow, with the vitalizing of geography and physical geography, that the life response side would be developed and made stronger in the laboratory without being made informal. I feel convinced that inevitable, continued change in physical geography instruction will be shaped along the lines of greater development of the life side rather than greater systematization of the description of land forms.

SUMMARY

The answers thus far received seem to show a strong consensus of opinion on certain points; namely, that courses for students not preparing for college should not be restricted to physical geography as outlined in the leading texts; that the life side of geography should be emphasized in a systematic way and that colleges should accept such courses for entrance; that regional geography should be given greater attention in secondary schools; that this work could be as disciplinary as the present subject and

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more valuable; that commercial geography has not yet won its right to special emphasis in most secondary schools and that the laboratory side of the work should be in no way decreased.

Opinions differ slightly as to the value of the present emphasis of the systematic classification of land forms. Several desired to see this phase of the work reduced and others would like to have it not go beyond the present limits.

The Editor believes that the time is ripe for a systematic endeavor to bring about the kind of work that is now in the minds of many people. He believes further that the topic is worthy of more study and will be glad to receive the opinions of all those interested. Other replies to the questionnaire will be printed in due course of time.

This subject is the liveliest topic in modern geography teaching. The "question is before the house." Let us have a free and frank discussion before the "question is called."

RICHARD ELWOOD DODGE.

STEEL SHIPBUILDING ON THE GREAT LAKES

By W. M. GREGORY
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THE development of the lake commerce within the past twenty years is frequently cited as one of the most striking examples of the enormous increase in freight tonnage in the world. It is true that in the short season on the Great Lakes almost eight times as much freight passes through the "Soo" as is sent by all the nations through the Suez canal. It is said that an average of one steamer every twelve minutes passes through this canal during the short season, carrying more freight than annually enters the harbors of London, Southampton and Liverpool combined. The freight traffic through the "Soo" for 1907 was 58,217,214 tons, or nearly four times as much as the total ten years ago. The history of commerce does not furnish a parallel of this record. The Detroit river is by a large margin the greatest commercial highway of the world. The merchandise traffic of 1907 through the Detroit river amounted to 67,292,504 net tons, some of which was 35,405,866 tons of iron ore bound to Lake Erie ports and 18,427,121 tons of coal from the mines of Ohio, Pennsylvania and West Virginia, northward bound.

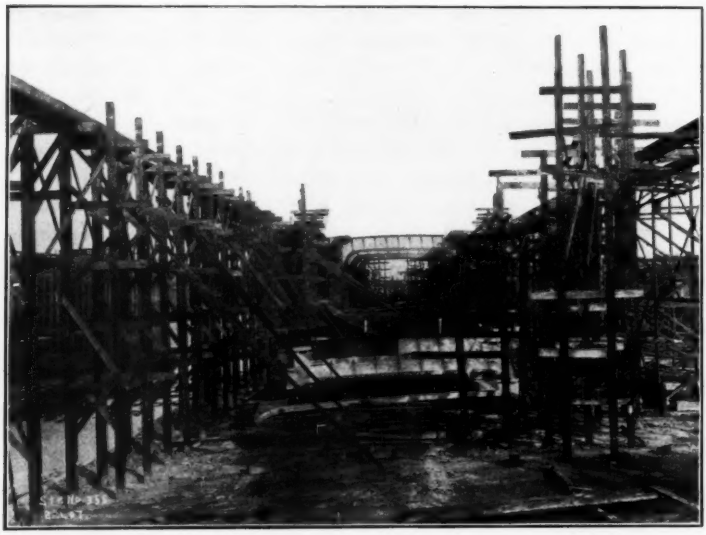
There are many causes which are operating to produce this great inland trade. It is a story of rapid settlement, discovery of unlimited supplies of raw materials, fertility of great plains, building of canals and the demand of the northwest for coal. In the states that border on the Great Lakes, is a population of thirty-four million people, more than two-fifths of the entire country. The activities of these people are centered about this great commerce and it is through their efforts that the east and west are supplied with the great commercial commodities of iron and coal.

At the beginning of this great expansion, when a glimpse of the rich ores of the north had first been obtained and the canal at the "Soo" was under consideration, it was Henry Clay that said "it is a work quite beyond the remotest settlement of the United States, if not the moon." It was the judgment of a politician but not a statesman, and time has abundantly revealed the wisdom of those hardy Michigan men who journeyed many miles on snowshoes in the dead of winter to urge the building of the first lock at the "Soo," to overcome the nineteen-foot fall in the rapids between the lakes.

Following the opening of this canal, came in quick succession the development of the copper mines and the early beginning of the iron mining. It is said that the first shipment of seven barrels or less of iron ore to

Cleveland was sold for its freight and in 1907 this same city received over six million tons of ore from the Superior region. In the open pit mines of the Mesaba ranges more than two hundred steam shovels, each doing the work of a hundred men, scoop up the soft ore and enable the operators to bring enormous quantities to the thirty or more docks at the west end of Lake Superior.

In the Mesaba range alone there was mined in 1907 over 27,390,000 tons of ore. The output of all the Lake Superior mines for the past year



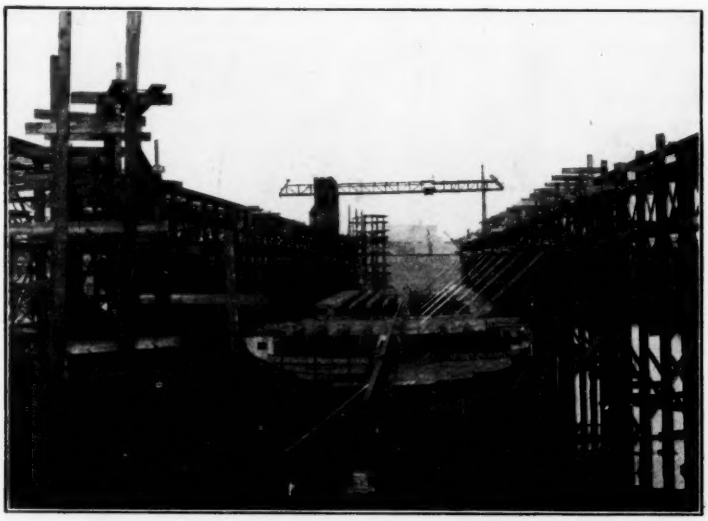
Steel ship construction. Putting the girders on the upright stanchions. Vessel is 12 days old.

was 41,288,755 tons, while the grain, coal and other commodities bring the total freight to be moved up to nearly a hundred million of tons. To carry this traffic requires almost two thousand boats, and there are more than a million people directly dependent on the carrying of this tonnage for their livelihood.

The supply of ships for this commerce is inadequate and the building of such a fleet forms one of the main industries of the Great Lakes. The days of the sailing vessel and the wooden steamer have passed and the lakes now float steel vessels equal in tonnage to those of the salt water.

The shipyards of the Great Lakes are at Detroit, Chicago. Lorain, Cleveland, Buffalo, Toledo, West Bay City and West Superior, Wis.

Each one of these yards has from two to three dry docks, sufficient for taking the largest freighters and in addition some have auxiliary floating docks. The various yards are well equipped with modern cranes, shears, traveling derricks and great varieties of metal working machines and employ



The construction of the "bottom" is well under way. The steel plates forming the mid-rib and the keel are seen in the foreground.

hundreds of men. The ideal place for a shipyard is a location near the big steel mills and easily accessible to the water, which is the case with Lorain, Ecorse, Cleveland and South Chicago, but the other yards are the outgrowth of the building of wooden vessels, especially those of West Bay City and West Superior.

After taking a contract for a freighter, the plans covering the complete details are first drawn. The outlines of the ship are not designed for beauty and trimness but for speed, capacity, and strength. The modern boat has its beginning in the skillful handiwork of the draftsman. After the vessel is completed in the blue prints, these are passed to the workers in the "mold loft" which is a great hall where the boat is laid out in full scale lines according to the working plans. On the floor of the "loft" white chalk lines show the exact size of the boat. Here is the "line ship," the length of the boat, and affixed to it at regular intervals are thin flexible

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pieces of basswood which show the size and location of the various beams and girders. Thin strips of wood are carefully cut and fitted into the places where the plates of steel will be located in the completed boat. Thousands of patterns of plates and beams are constructed, all of which are marked with dots to show the location of rivet holes and each one bears a letter and number to show its position in the ship. The models

A typical riveting gang. The pneumatic hammer, chisel and header are the tools used in placing the rivets which are heated in the air furnace. More than seventy gangs of this size are working on the riveting of this boat.

in wood go to the "iron department" where the steel plate is cut by giant shears, bent and shaped on the bending floor, then the rivet holes are punched. The number of rivet holes in the plates of a modern freighter is nearly a million and a half. In one corner of the iron shop is a small machine,shaping iron bar into rivets at the rate of forty a minute. In a shipyard all seems hopeless confusion to the visitor, but on the contrary it is a most orderly place, the material is all arranged with care in groups, so that very little rehandling will be necessary when the boat is being assembled.

While the draftsman and plate workers have been busy, the ship engineer has carefully lined and leveled the keel blocks along the face of

the dock and on these the ship will gradually grow. The blocks are spaced four to five feet apart and high enough to allow the workman to pass freely under the keel at all points. If the boat is to be launched sidewise as is the practice in many of the yards, the blocks are practically level, while if lengthwise the blocks gradually increase in height from the water and form a curve which is the exact outline of the keel to be laid. The usual type of the keel consists of vertical plates of heavy steel riveted together and extending the entire length of the boat and to this backbone are joined the bottom plates. Perpendicular to the keel, the members of the frame are laid which divide the bottom into many water-tight compartments. On these frames are laid the plates for the inside of the boat and on the outside is placed the heavy outer plating. If the latter is damaged the boat will still float and the cargo remain intact. The openings between the two layers of plates can be filled with water to ballast the boat when it is shipping light. The most modern of freighters is divided into many "hoppers," so that a mixed cargo may be carried and this form of a vessel is easier to unload than the flat bottom boat, because of the slanting sides of each hopper.

The sides of the boat are steel girders or stanchions; these are raised into long rows and riveted to the framework of the bottom. The upper ends of the stanchions on opposite sides of the boat are connected by heavy "I" beams and then the framework is completed. As the laying of the plates inside and out continues, it is possible to see seven to eight hundred men at work on the boat in this stage of its construction. The main work is the riveting of the plates and there may be over four hundred men working in gangs of four doing this particular thing. Many automatic metal working tools are in evidence: borer, countersinker, rimer, chisel, welder, benders and especially the pneumatic riveter. It is only a few weeks before the boat is ready for launching. The blocks are then removed except the two at the ends; at a signal these are loosened and the boat slides down the sloping ways of heavy timbers for its first dip into the water. The launching is a great occasion which is eagerly watched by the builder and owner. Someone has defined the modern freighter as a mammoth steel trough with a lid on it, and this is one's impression of the boat as the big steel tube glides into the water, It is next fitted with motive power, the boilers and engines lifted into place with huge shears capable of lifting 1,000 tons and it soon starts on its first trip over the busy lakes.

The rapidity with which the vessels are constructed in the Great Lake region is a source of wonder to the visitor who is familiar with the time required by a foreign yard for the completion of a freighter. The record

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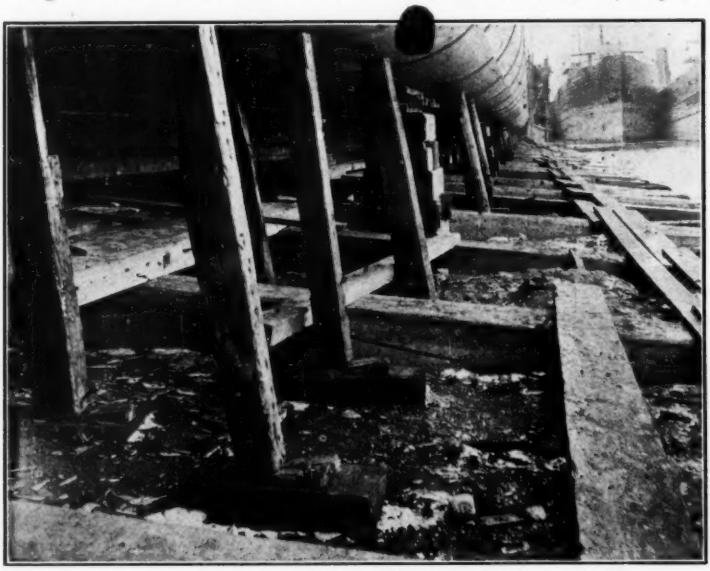
time for a six-hundred-foot boat is held by a lake yard which completed such a boat in forty days after the receipt of the contract. Many boats have been built over 600 feet in length but the present tendency is towards 500-footers because they are easier to navigate through the locks, the rapids of the St. Mary's River and the narrow curves of the St. Clair flats. It takes only nine of the larger boats to make a mile and each one easily holds a cargo of two hundred cars of coal. The Leland DeGraff, 605 feet



A 600 footer on the "ways" ready for the sidewise launching.

in length, one of the longest boats on the lakes, in July, 1907, loaded thirteen thousand tons of soft coal, the largest cargo of coal ever floated. This same boat in 1907 carried 422,000 bushels of wheat to Buffalo, establishing another world record. This cargo of grain is the production of 30,000 acres and would make 84,000 barrels of flour. In contrast to this cargo of the Leland DeGraff is that carried by the British steamship Aparina which sailed from Tacoma, Washington, on December 10th, of last year, with 273,636 bushels of wheat, which is the record cargo for the Pacific coast. The lake ship cargo is nearly fifty per cent. greater. In the season of 1907 the H. H. Rogers carried over 323,000 tons of ore in twenty-seven cargoes. The freight at sixty cents a ton on ore means a big

item each trip and an average profit to the owner of four or five thousand dollars. While this amounts to a big income in a season, yet it is a great saving to shippers, for without this lake transportation it would cost nearly four dollars per ton to deliver the ore by rail at the Ohio ports. The average cost of these vessels is about $325,000, the lowest being $280,000 and the highest $420,000. At the present time there is over one hundred and fifty million dollars invested in the lake carriers.

The past year has been one of great activity in the lake shipyards; fifty-six vessels were launched; of these eleven were from the yards of one company. The Canadian yards in the same time have launched two bulk freighters and two car-ferries. As might be surmised forty vessels out of the total were freighters and the combined capacity which these boats add to the lake fleet, for each trip that they make, is 368,000 tons. Six of these freighters were over six hundred feet in length and twenty of the vessels launched were built for Cleveland firms.

The rank in the number of vessels built at the various yards on the Great Lakes for 1907 is as follows: Lorain, O., and Ecorse, Mich., nine each, Wyandotte six, four each at Cleveland, Buffalo, West Bay City and Toledo, three at Chicago and Ferrybury, Mich., and the remainder scattering. The center of the shipbuilding is the Detroit River district which in 1907 produced more than two-fifths of the total output and Michigan leads the lake states in the number of ships built.

It is interesting to note that in 1906 forty freighters were built, and in 1904 only seven were launched. The total output to date for the remarkable lake shipbuilding régime, which commenced with such activity in 1902, is two hundred and sixty-five vessels of which two hundred and nineteen are large bulk freighters. In making comparisons it is well to recall that in 1886 there were only six steel vessels on the lakes. Within the past six years there has been added to the lake fleet, vessels having a gross carrying capacity of 29,773,000 tons in a full season and those to be launched in 1908 will increase this to over 33,867,000 tons which is greater than the total movement of iron ore in any single year up to 1905. In the movement of the various commodities, vessels are organized in groups, the largest of which is the Pittsburg Steamship Company's fleet of one hundred and five boats. This fleet is devoted entirely to the movement of iron ore and the other fleets are for the handling of ore, grain and coal. At one time one fleet consisted of ten "whale-back" vessels, peculiar cigar-shaped boats. These were used for ore and grain, but owing to the shape of the hold which is difficult to unload, this style of boat is no longer built.

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A PRESENT WEAKNESS IN TEACHING GEOGRAPHY

By WALTER SHELDON TOWER
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THE map which should be the teacher's best friend in geography, is at present subject to much neglect and abuse. It is, I believe, not too much to say that many a teacher of geography uses maps without any personal understanding of them or real appreciation of what valuable adjuncts they are. This fact was brought to my attention some time ago when I had occasion to ask a class composed of teachers, most of them from high schools and from widely separated cities, how many understood the ordinary topographic map issued by the United States Geological Survey. One of the teachers from a large city high school, made reply: "I have used them a good deal but I never knew what they meant." Unfortunately my surprise was so great that I failed to inquire just how they had been used under such conditions. Later it appeared that another of the same class, teaching geography in a well-known normal school in the west, could not understand that the compass needle points to the north irrespective of the letter "N" on the compass box.

From these evidences of inefficiency on the part of those who had been professedly teaching geography, I was led to investigate the general result on the pupil, taking college freshmen as an example. It appears to be a most common occurrence that the position of maps in the classroom has been allowed to create an entirely erroneous impression of the areas represented. Thus, to the question "When you think of Canada where is it in your mind?" the usual reply was "Up here somewhere," with a gesture indicating where the top of an imaginary wall map would be. Obviously Canada is not "up here" and a small amount of careful instruction would effectively dispel any such illusion. Again, nine-tenths of the younger students seem to have no idea of the proper perspective of the southern hemisphere because they have been continually looking at maps in the wrong position, with no warning about the danger of error. In several instances it appears that a classroom facing south resulted in a confusion of compass points, because with maps hung against the south wall places actually in the east *appear on the map* toward the west of the student, and vice versa. Such a confusion seems absurd, it is true, but week after week of such wrong impressions must undoubtedly be harmful.

A very simple remedy for all these difficulties is found in using maps, at least occasionally, in a horizontal position, with care to observe the

correct orientation. Putting an ordinary map on the floor in the proper position and allowing the students, especially beginners, to stand over it with the knowledge that they are *looking down* on the country will very soon cultivate the correct mental attitude toward map features. Where available, relief models are still better.

In addition to various false notions carelessly allowed to develop, there is among college freshmen a very apparent lack of thoroughness in whatever geographic study they may have had in school. I am led to believe that map exercises on the part of the student himself are not generally practiced or are allowed to be done in a careless manner. To test the degree of familiarity with their own country, outline maps of the United States were given to a class of seventy-two college freshmen, with a few upper classmen, in a course on political geography. As a preliminary to taking up the study of the United States, and before a map of the United States had been shown in class, the students were instructed to give the appropriate names to the states, all the boundaries being given on the map. Among the seventy-two students there were but seven who handed in correct, completed maps, three of the seven being from the upper classmen in the course.

It may be worth while to note some of the innumerable combinations of errors. In five cases one or more states were omitted in each case where a river marked the boundary. The most frequent mistakes were the reversal of New Hampshire and Vermont; New Mexico and Arizona; Oklahoma and Indian Territory; each of these errors occurring eight times. The reversal of Colorado and Wyoming; Mississippi and Louisiana; Wisconsin and Minnesota; Oregon and Washington: Kansas and Nebraska; Wisconsin and Michigan; Indiana and Illinois; Arkansas and Missouri, etc., were found four or more times in each case. Some of the worst errors were such as interchanging Nebraska and Idaho; Nevada and Wyoming; or putting Missouri for Illinois; Illinois for Iowa; and Iowa for Missouri, as appeared on one map. Subsequently a similar exercise was tried with respect to name and location of the principal cities and names of the largest rivers, but as was expected from the result of the previous trial, the outcome served only to confirm the impression of wholesale ignorance.

Every one of the seventy-two students in question had had some sort of school study in geography in which the United States had been taken along with the rest of the world, but the result can not be regarded as satisfactory. I do not wish to maintain that the most desirable aim in

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geography is the mere learning of a multitude of names, locations, boundaries and so on. But I do believe that until a student can picture accurately in his imagination the positions and relationship between the integral parts of his own country, it is of little practical value to teach him anything further about those integral parts. A college freshman is certainly past the age when he ought to know that New Mexico is not in the northwest or that New Orleans is not on the Gulf of Mexico, as one freshman would have them.

Much of the fault undoubtedly lies in the fact that the importance of geography has only recently been recognized and is still taught in many cases by persons entirely unequipped for it. The fault lies partly also in the school text-book in which the maps are included, often to profusion, and that ends it; little or no use being made of them beyond casual reference. Great care is given to the selection of pictures for illustration, but frequently no care is taken that all maps shall be of the same scale, or, if unavoidably of different scale, the student is given no warning of the fact and no basis of comparison is provided to prevent wrong impressions. In a surprisingly large number of cases I have found that students beginning a freshman course actually do not know what a map scale is or have no clear idea of what it means.

Map study should be the basis from which geography is taught and these pitfalls should be carefully guarded against. With a little care in their use maps can be made real to the student and working through the power of the imagination thereby crystallize subjects which otherwise are disjointed or intangible in the student's mind. The failure to utilize properly the great wealth of map material easily available, and the failure to make maps and map work the basis of careful study is a serious weakness in much of the present teaching of geography.

POPULATION OF THE STATE OF OKLAHOMA.—Oklahoma and the Indian Territories were admitted into the Union in November, as the State of Oklahoma. The President directed, in June last, that a special census be taken of the proposed new State and the results are printed in Census Bulletin 89. The population is now 1,414,217, as compared with a population in 1900 of 790,391, an increase in seven years of 623,786 or 78.9 per cent.

The whites number 1,226,930 (656,473 males, 570,457 females); the negroes 112,200 (58,277 males, 53,923 females); the Indians 75,012 (37,582 males, 37,430 females); Mongolians, 70 males and 5 females.—*Bulletin American Geographical Society, January, 1908.*

ECONOMIC NOTES

By EDWARD VAN DYKE ROBINSON
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WATER POWER IN JAPAN.—A report of Counsul-General Henry B. Miller of Yokohama, indicates that within from 80 to 150 miles of Tokyo there is available water power amounting to 300,000 horse power. It is estimated that at present the requirements of Tokyo represent 48,000 horse power and that plants now in construction will call for 20,000 additional, without including the electric road from Tokyo to Yokohama. It would seem, therefore, that the mountainous surface of Japan together with the heavy rainfall offer water power in considerable abundance and that it is likely to become a factor of growing importance in the industrial development of Japan.

RUBBER IN THE MALAY STATES.—The American public is familiar with flaming advertisements of rubber plantations in Mexico and Central America. These alleged plantations are frequently intended not to cultivate rubber but to separate the fool and his money. In the Malay Peninsula, however, rubber culture has really been placed on a commercial basis. According to recent statistics the Federated Malay States exported in 1906, 1,028,792 pounds of cultivated rubber, and in 1907, 1,984,285 pounds, showing an increase within the year of nearly a million pounds.

TEA IN THE CAUCASUS.—Not a little has been written regarding tea culture in the region of the Caucasus. Some books have represented the industry as thriving and others as practically extinct. A recent report by Consul Masterson of Batum indicates that the Russian government is still continuing experiments and that in addition a number of land owners along the Black Sea coast immediately to the east of Batum, are raising tea in small quantities which is sold in the local market in competition with Chinese tea. It would therefore seem to be only a question of time and experience when the tea industry in these districts will reach commercial importance.

NEW POTATO PRODUCTS.—The German potato crop, averaging 43,000,000 tons annually, is considerably in excess of the demand both for household and industrial purposes. It is estimated that 10 per cent. of the total crop has annually gone to waste. Experiments have now been brought to a successful issue looking to drying potatoes. The so-called Paucksch system produces potato flakes. The Heiler system produces potato flour. Already there are about 130 potato drying plants throughout Germany.

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The potato flake sells for $3.50 per cwt. and potato flour and other forms of dried potato at $1.50 to $2.50 per cwt. For the present the largest market seems to be as stock food.

THE GEORGIAN BAY CANAL.—The Canadian government is proceeding with the survey of the route of the Georgian Bay Canal. The plan contemplates a ship canal 22 feet deep, the whole route from Georgian Bay to Montreal covering a distance of 440 miles. The ascent from Georgian Bay to summit level is 99 feet while the descent from the summit level to Montreal is 659 feet, making a total lockage of 758 feet. The plan contemplates 27 locks varying in lift from 10 to 50 feet. This route represents a former channel by which the water of the Great Lakes reached the sea, and is now practically a chain of deep lakes or wide river expansions which would offer 357 miles free navigation and a considerable number of miles of canalized rivers, with not to exceed 40 to 50 miles of actual canals. This route would save about two days on the trip from the lakes to the ocean and would reduce the cost of transportation proportionately. There would also be developed immense water power at various places. It is within the range of possibility that the Georgian Bay Canal would divert to the St. Lawrence route a large part of the export trade from the American northwest which now goes by way of Buffalo and New York.

DALNY, MANCHURIA.—Reports from Manchuria indicate that the Japanese have decided to use Dalny "the fiat city" created by the Russians, as the commercial outlet of Manchuria. It is difficult to see the reason for this unless it be political as the natural port of southern Manchuria is at New-Chwang, which lies at the head of a bay and at the mouth of an important navigable river.

A NEW INTEROCEANIC RAILWAY IN GUATEMALA.—A new interoceanic railway has been opened connecting the Atlantic with the Pacific; this time through Guatemala. It connects Puerto Barrios on the Caribbean Sea with Guatemala City 196 miles away and is continued by a line 75 miles in length to San José on the Pacific, the total length thus being 271 miles. Owing to the mountainous character of the interior and the heavy grades to be surmounted, the line is not likely to compete for international traffic with that recently completed across the Isthmus of Tehuantepec in Mexico; but it brings the coffee growing portions of Guatemala within easy reach of New Orleans and New York. It is, of course, well

known that the populated and productive portions of all the Central American states is along the Pacific, the Atlantic coast being so drenched by the rain from the Trade winds as to be almost uninhabitable.

MAGDALENA BAY.—A good deal of interest is attached to Magdalena Bay at present where the American fleet assembled for target practice, and the Mexican government has established a custom house there. This bay, located in Lower California, is described by naval experts as measuring some 9 by 15 miles, perfectly protected and with such deep water that it can be entered with entire safety at any state of the tide, something which is not true of any port on the Pacific south of Puget Sound. American naval officers have repeatedly called attention to the importance of this bay to the United States for naval purposes, and shortly after the Spanish War Rear Admiral Bradford, Chief of the Bureau of Equipment of the Navy Department, wrote a notable article in the *Forum* relating to naval and coaling stations for the American navy, in which he urged that it be leased for the use of the navy. It has been rumored several times that negotiations were on foot looking to the acquisition of this bay by the United States, but as yet nothing has become public regarding it. When the Panama Canal shall be opened, the United States will be under the absolute necessity of having some secure naval station nearer the entrance of the Canal than San Francisco, and Magdalena Bay on the north offers the best site for such a station. On the south the Galapagos islands now belonging to Ecuador are thought to furnish the best site.

NOTES

NUTS AND THEIR USES AS FOOD.—To the last Year Book of the Department of Agriculture Prof. M. E. Jaffa, of the University of California, contributes an instructive article on the uses of nuts as food. The early explorers of America were much impressed by the extended use of nuts by the American Indians. The native hickories, butternuts, walnuts, chestnuts, and many other nuts found in the United States were gathered by the natives and formed one of their principal sources of food. The shelled nuts are split, dried, and ground with a mortar and pestle. The sifted flour is then placed in a hollow in the sand, on a convenient river bank, and leached to free it from the bitter principles present. From the leached meal a porridge or mush is made, which to the ordinary palate is much improved by the addition of salt. These typical Indian foods, when well prepared, are relished by many persons who have tried them,

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and it seems not improbable that improved methods of removing tannin and the bitter principles present in most varieties of acorns might result in the utilization of the acorn crop, which is fairly large and is generally wasted.

Lately the use of nuts has greatly increased in the United States, with the result that many persons are now growing native and foreign nuts on a commercial scale. The quantity of almonds, cocoanuts, Brazil nuts, filberts, peanuts, walnuts, and other nuts, shelled and unshelled annually imported into the United States is, in round numbers, 90,000,000 pounds with a value of $6,250,000. In 1905 the total almond crop in California reached 4,200,000 pounds and the walnut crop 12,800,000 pounds. The richest yield of peanuts was reported from the Southern States, chiefly Virginia, Georgia, and Tennessee, and amounted to 225,000,000 pounds.—*National Geographer Magazine.*

Some Effects of Climate.—Climate determines both how and where man shall live. It classifies the earth's surface for us into the so-called habitable and uninhabitable regions. The deserts of sand and the deserts of snow and ice, whether the latter be near sea-level or high up on mountain tops, are alike climatic—the former because of aridity, the latter because of cold. The only non-climatic deserts are recent lava-flows. Where a soil is present which is not frozen for much over half the year, and where there is reasonable temperature and sufficient rainfall, plants and animals are found, ranging from few and lowly forms where conditions are the hardest and where all organic life is especially adapted to these conditions, to the greatest abundance, where conditions are most favorable.

Man is influenced by much the same controls as those which affect plants and the lower animals. From the highest latitudes he is excluded by cold. The higher altitudes are hostile both because of cold and of diminished pressure. The deserts of sand are uninhabited or thinly populated by reason of aridity. Forests, where rainfall is abundant, are unfavorable to a dense population. The trees must be cleared away before settlement is easy. Man is widely distributed over the earth's surface. In his migrations he has carried with him, beyond their original limits, many plants and animals. Ratzel points out that the coldest place in the world in January is a Siberian city, Verkhoyansk; while one of the hottest places in the world is Massaua, on the Red Sea, the capital of the Italian

colony of Eritrea. But the life of man is harder here and easier there, according to climatic conditions and the scarcity or abundance of plant and animal life.

Man is distributed in great belts around the world corresponding roughly to the broad zones of vegetation, desert, steppe, and forest, the limits of which are set by temperature and rainfall, but man is much more dependent on rainfall than upon temperature. Water he must have, directly from the clouds, or indirectly through rivers, or springs, or wells, or from melted snow and ice. There are certain common conditions of life which affect the people who live in the same zone in the same broad, general way, just as these zones have similar general conditions of winds and of rainfall. This, as Ratzel has pointed out, means that there is a climatic factor at work to maintain differences between the people of different zones, in spite of the great movements which are constantly tending to produce uniformity. Obviously the differences in the life of man which depend upon climate will be most noticeable, and will be likely to have the greatest historical significance, when marked differences of climate are found close together, as in the case of mountain ranges like the Alps, or of a pronounced lowland, plateau, and mountain topography like that of Peru or Mexico.

All the regions of sparse population are gradually being encroached upon by an invasion from their borders. Forests are being cleared and replaced by open agricultural lands. Wheat and corn are replacing grass on the steppes and savannas, especially where irrigation can be practised. Deserts are being reclaimed for farming here and there where water is available. The more civilized man becomes, the denser the population which the different parts of the earth can be made to support. From the wandering hunting and fishing tribes of the African forest or of the borders of the Arctic Sea, through the farming populations of the cleared forest and of the steppe, to the crowded industrial centres of the modern city, there is such a gradation. It is the story of a more complete to a less complete mastery of man by his environment. But in spite of all that man can do, the largest climatic limitations persist. The Greenland desert of snow and ice and the Saharan desert of sand must remain practically deserted.—*From Climate and Man by R. De C. Ward, Bulletin of American Geographical Events, December, 1907.*

Lowest Point in the United States.—The United States Geological Survey has just completed a line of spirit levels through Death Valley, California, and, much to the surprise of every one familiar with the region, has ascertained that the depth of that area is not so great as

was supposed. The final computations of the results have not yet been made, but the preliminary figures give for the lowest point a depth of 276 feet below sea-level. Bennetts Well, which is near this point, is 266 feet below sea-level. These figures may be altered by two or three feet when the final computations are made, but they are probably not more than three feet in error. The Geological Survey now has elevation marks on the highest and lowest points on dry land in the United States.

It is a strange coincidence that these two extremes are both in Southern California and only 75 miles apart. Mount Whitney is a foot or two over 14,500 feet above sea-level, while Death Valley, as above stated, is 276 feet below. Before the Salton Sink, also in Southern California, was flooded by the Colorado River, it contained the lowest point of dry land in the United States, a spot 287 feet below sea-level.

Previous estimates of the depth of Death Valley based on barometer readings gave for the lowest point figures varying from 250 to 450 feet below sea-level. The level line of the Geological Survey is believed to be the first accurate determination of elevations in that locality that has ever been made.—*National Geographic Magazine.*

Wind Observations and Records.—A simple and useful series of observations and records can be made to find the prevailing wind and the relation between wind and rainfall. Draw a circle about 20 inches in diameter on a sheet of drawing paper with intersecting lines showing eight points of the compass. Replace these single lines by double lines half an inch apart and draw cross lines a quarter of an inch apart, dividing the whole into a series of rectangles ½ inch by ¼ inch. Each day record the direction of the wind by filling up one rectangle in the appropriate direction with crayon, using blue or yellow according to whether the day is wet or dry. In a few weeks the prevalence and dampness of the west and southwest winds will be evident.—*Geographical Teacher, London.*

Geographic Names in the United States.—The recent suggestion of the Honorable Mr. Bryce, the Ambassador from England, advocating the abolition of the names of towns which are duplicates of others, elsewhere, draws attention to the fact that perhaps no country on earth possesses as many towns whose names are taken from others, as we. Look up your gazetter for example. It starts with Alabama, giving the states in alphabetical succession.

There is Cherokee, stolen from an Indian nation in the Indian Territory; for a county, Andalusia, a faraway province; Ashville, which has

its rival in Tennessee; Athens and Auburn,—suggestive of Greece and of England; Birmingham, likewise an English town; then Bridgeport, duplicated in Connecticut, and here Cardiff bespeaks its Welsh origin; Center and Centervilles are innumerable. Cordova and Cuba; Dayton, less famous than its Ohio duplicate, and perhaps more so than a Kentucky namesake; Eden and Elba, Florence and Port Deposit; Geneva, Greensboro, Hamilton and Hillsboro; none of these are alone in the category of settlements. From Holywood in California to Jackson, Tennessee; from far-away Joppa to Louisville, Alabama has stolen cognomens.

These are but a few of the more suggestive, and this is but one state out of forty-four.

Why this dearth of names in our country when we have all the lore of the Indian; let alone present Yankee originality to draw upon?

Certainly there is reason in the ambassador's suggestion that there be but one town of a name in the land.—FELIX J. KOCH.

THE WORLD'S LARGEST ISLAND.—Geographers have been accustomed to accord to Borneo the reputation of being the world's largest island. This, however, has recently been announced an error. According to a recent authority, New Guinea is considered larger, and must for the future be accorded first place. The island is irregular and much extended in a northwest and southeast direction, so that its greatest length is little short of fifteen hundred miles, a distance as great as the whole width of Australia, from Adelaide to Port Darwin, or of Europe from London to Constantinople. Its greatest width is 410 miles, and omitting the peninsula forming its two extremities, the central mass is about 700 miles long, with an average width of 320 miles, a country about the size of the Austrian Empire.—FELIX J. KOCH.

PHYSICAL GEOGRAPHY IN HIGH SCHOOLS.—The report of the Commissioner of Education for 1905-6 stated that 151,537 pupils were pursuing courses in physical geography in the 8,031 public high schools of the country in the year under review. This is 20.97% of the total enrollment in these schools. Ohio, Pennsylvania and Illinois lead in this regard, each state reporting over 14,000 pupils pursuing the subject. In the 1,028 private high schools reporting statistics, 18,646 pupils or 18.32% of the total registration were taking the subject. In both types of schools the percentage of enrollment is much less than it was in 1895-6 in the same subject. With the exception of physiology, the percentage of enrollment in physical geography is greater than for any science.

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ACCURACY IN GEOGRAPHY TEACHING.—A recent educational periodical presents the supposed correct answers to a series of questions in physical geography for high school certificates. Two questions with approved answers are given below. Comments as to accuracy, completeness and clearness are unnecessary.

Question: To what region must we look for the cause of the circulation of the winds of the globe?

Answer: The equatorial region is the indirect cause of the winds, for the hot air of the region near the equator rises and that needs a circulation of the atmosphere to restore equilibrium.

Question: What conditions modify the fauna of each continent?

Answer: Water supply, climate, humidity, temperature, food supply and the possibility of migration.

WHAT DOES PHYSICAL GEOGRAPHY INCLUDE?—Opinions differ greatly as to what should be included in a secondary school course in physical geography and many believe that the subject is merely informational and hence that it may include almost any topics. Are the following questions from a recent official examination, geography questions? If so, can any limit be given to the inclusiveness of the subject?

1. How are the following substances formed: coal, coral, limestone, basalt?

2. What are igneous rocks? Why is it difficult to tell the age of igneous rocks?

THE EVERGLADES OF FLORIDA.—Government engineers, according to a recent number of *World's Work,* have recently surveyed a line across the everglades of Florida as the first necessary step in reclaiming "77,000,000 acres of the most fertile land in the United States,—a region greater in extent than the whole of the British Isles." As a direct result of the work 30,000 square miles can now be reclaimed and Lake Okeechobee itself, 22 feet above the sea, is proved to be capable of easy drainage.